The Risks of Sport Specialization in the Youth Population:  
A Critically Appraised Topic

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RESULTS

In recent years, due to a push from parents, coaches and society to play and compete at a higher level, sport specialization in the youth population has become more prevalent. Numerous risks are associated with early specialization, the most common being an increased risk of injury. Some rules are being put in place to decrease injury risk among athletes; however, there are no rules in place to prevent or limit youth athletes from specializing in one sport. For the purposes of this Critically Appraised Topic (CAT), sport specialization is being defined as training in a single sport year-round, with injuries including both chronic and acute injuries seen or reported to a health care provider. Unfortunately, using these operational definitions, many studies have found a correlation between sport specialization and injury risk.

In the youth population, there is a push to specialize in one sport to play and compete at a higher level, which increases the risk of injury in youth athletes.1-6

We recommend that sport specialization should be reduced in youth athletes, and the following interventions be performed:

- Alter/restrict the training volumes linked to single sports
- Have certified Athletic Trainers oversee activities
- Encourage youth athletes to participate in multiple sports
- Develop a recommendation grade of B.

Future research should continue to examine upper and lower extremity injury risk, long-term effects of sport specialization (i.e. injuries, health complications) and the roles of proper sport technique and specialization on injury risk.

CONCLUSIONS

Inclusion and Exclusion Criteria

Studies that were included examined the effects of sport specialization on injury risk in the youth population, were a Level II evidence or higher, of the English language, and limited to athletes under 18 years of age who specialized in one sport. Articles excluded were those that focused on burnout or triathletes, articles written prior to 2006, studies on those aged 19 or older, studies on multi-sport athletes and those manuscripts that presented recommendations rather than study data collected.

METHODS

Search Strategy

Terms Used in the Search Strategy (PICO)
- Patient: youth athletes
- Intervention: sport specialization
- Comparison: none
- Outcome: injuries (risk OR acute OR overuse OR burnout)

Sources of Evidence Searched
- PubMed
- ProQuest Central
- SPORTDiscus
- CINAHL
- Google Scholar
- Hand Search

MAIN RESULTS

Highly specialized athletes are more likely to report a history of knee (OR, 2.30; 95% CI, 1.22-4.44; P = .009) and hip (OR, 2.74; 95% CI, 1.09-6.84; P = .026) injuries when participating in a single sport for more than 8 months per year. Specialization in a single sport increased the relative risk of patellofemoral pain 1.5 fold (CI, 1.0-2.2; P = .038), and 4 fold (CI, 1.5-10.1; P = .005) for developing apophyseal knee injuries or patellar tendinopathy than multi-sport athletes.

CONCLUSIONS

Single sport athletes had an increased injury risk of LEI: Early sport specialization was associated with increased risk of anterior knee pain disorders compared with multisport athletes:

Players who specialized in tennis were more likely to report a previous injury. Players who suffered an injury in the last year had a higher risk of future tournament withdrawal.

Athletes who were classified as either moderately or highly specialized were more likely to sustain a LEI than those who were classified as low specialization.

REFERENCES


THE EFFECTS OF ADHD AND LEARNING DISABILITIES ON SPORT-RELATED CONCUSSION NEUROCOGNITIVE BASELINE TESTING IN HIGH SCHOOL STUDENT-ATHLETES: A CRITICALLY APPRAISED TOPIC

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INTRODUCTION
One out of every ten injuries sustained in high school athletic programs is a sport-related concussion (SRC).1 A concussion is a complex pathophysiological process affecting the brain that is induced by traumatic biomechanical forces.1 • Computerized neurocognitive testing is one component of the multifaceted approach used to manage a SRC. • The ImPACT is a common computerized neurocognitive tested used to manage SRC that assesses verbal memory, visual memory, visual motor, and reaction time (Figure 1).

Developmental, behavioral, and learning disorders have emerged as disabling health conditions that affect one in six children in the United States.2 • A recent international consensus statement indicated that developmental conditions may influence the diagnosis, management, and return to play outcomes following SRC. • Computerized neurocognitive tests typically fail to accommodate to those with neurological impairments such as athletes with attention-deficit disorder (ADHD) and/or a learning disorder (LD).

CLINICAL QUESTION
Do high school student-athletes with ADHD and/or a LD perform similarly or different compared to those without ADHD or a LD on baseline computerized neurocognitive tests?

METHODS

Terms Used to Guide Search: 
• Patient/Client group: High school athletes 
• Intervention/Assessment: ADHD and/or LDs 
• Comparison: No ADHD and/or LD

Sources of Evidence Searched: PubMed, Medline, SPORTDiscus

Inclusion Criteria: 
• High School Athletes 
• History of ADHD, LD, or both 
• Between the ages of 13-19 
• Valid ImPACT baseline test 

Written in English

Exclusion Criteria: 
• Middle school, collegiate, and/or recreational athletes 
• Invalid baseline test scores (>30 on ImPACT)

The literature search returned 10 possible studies related to the clinical question, but only 5 studies1,3,4,5,6 were included as they meet the inclusion and exclusion criteria (Table 1).

• Three studies1,4,5 compared subjects with ADHD to a control (i.e. no ADHD) group, while the remaining 2 studies3,6 compared control, ADHD only, LD only, and combination ADHD/LD groups.
• High school student-athletes with ADHD and/or a LD performed significantly worse on 1 or more baseline ImPACT neurocognitive composite variables compared to high school student-athletes without ADHD and/or a LD.1,3,4,5,6
• High school student-athletes with ADHD and/or a LD endorsed significantly more symptoms at baseline compared to high school student-athletes without ADHD and/or a LD.1,3,4,5,6

DISCUSSION

High school student-athletes that have ADHD and/or a LD are predisposed to lower baseline computerized neuropsychological scores compared to those without ADHD or a LD. This predisposition brings forth numerous problems with using general population normative baseline scores for post-injury comparisons and return to play decision-making with these special populations.

CLINICAL IMPLICATIONS
• It is imperative that pre-season neurocognitive concussion baseline tests be collected for student-athletes with ADHD and/or a LD in order to provide an accurate pre-injury cognitive ability measurement for these individuals.
• Without a personalized baseline score for this special population, recovery times may be increased as they would appear to be impaired for longer when compared post-injury to the general population normative values.
• This unintentional increase in time lost from sport could lead to adverse psychological effects, such as anxiety and depression, that accompany prolonged recovery times.

Future research should focus on tailoring return to play SRC management plans for athletes with ADHD and/or a LD.

REFERENCES

Figure 1: Athlete taking the ImPACT

Table 1. Characteristics of Included Articles

<table>
<thead>
<tr>
<th>STUDY DESIGN</th>
<th>Brooks et al.1</th>
<th>Cook et al.4</th>
<th>Elbin et al.5</th>
<th>Salinas et al.6</th>
<th>Zuckerman et al.3</th>
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<tbody>
<tr>
<td>PARTICIPANTS</td>
<td>Boys with ADHD (n=249)</td>
<td>Control Boys (n=249)</td>
<td>Girls with ADHD (n=100)</td>
<td>Control Girls (n=200)</td>
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<tr>
<td>Cognitive test group</td>
<td>ADHD medication (n=764)</td>
<td>ADHD no medication (n=1,530)</td>
<td>ADHD only (n=862)</td>
<td>Combined ADHD/LD (n=161)</td>
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<tr>
<td>Outcome measures</td>
<td>ImPACT scores and symptoms reporting</td>
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| Main results          | The results of a series of ANCOVAs (co-varied for sex and baseline cognition) did not differ between the four groups on verbal [F(3,372)=11.02, p<.001; girls: d=0.27, boys: d=0.63], visual [F(3,372)=11.39, p<.001; girls: d=0.27, boys: d=0.57], and reaction time [F(3,372)=7.16, p<.001; girls: d=0.27, boys: d=0.57]. Significant differences were also reported for visual motor speed [F(3,372)=7.32, p<.001; girls: d=0.27, boys: d=0.57] and total symptoms [F(3,372)=15.27, p<.001; girls: d=0.27, boys: d=0.57]. It was also reported that high school athletes with ADHD were nearly twice as likely to have sustained a previous concussion (ADHD 14%, non-ADHD 7.8%) compared to those without ADHD.

The ADHD/Medication group did not differ significantly from the non-ADHD boys (F(3,17,885)=139.16, p<.001; girls: F(3,17,885)=139.16, p<.001; boys: F(3,17,885)=106.18, p<.001).

ADHD no medication group (girls: d=.56, boys: d=.53), ADHD medication group (girls: d=.63, boys: d=.42) differed significantly and reported more severe symptoms compared to control groups (girls: F(3,17,885)=139.16, p<.001; boys: F(3,17,885)=106.18, p<.001).